Frequently Asked Questions (FAQ)
About *Principles and Standards for School Mathematics*
In Grades 3–5

What are the emphases of the grades 3–5 curriculum?
There are three central themes for the grades 3–5 curriculum. Multiplicative reasoning is a way of viewing and thinking about situations in which multiplication or division is an appropriate operation. Equivalence involves the ability to recognize, create, and use equivalent representations of numbers and geometric objects. Students should also develop computational fluency with whole numbers based on strong conceptual understanding.

Does *Principles and Standards* support teaching the "basics"?
Absolutely. A major goal in the elementary grades—prekindergarten through grade 5—is the development of computational fluency with whole numbers. Fluency refers to having efficient, accurate, and generalizable methods (or algorithms) for computing that are based on well-understood properties and number relationships. Some of these methods are performed mentally, and others are carried out using paper and pencil to facilitate the recording of thinking.

Are students in grades 3–5 ready to study algebra?
Although ***algebra*** is not a word that has been commonly heard in elementary school classes, the mathematical investigations and conversations of students frequently include elements of algebraic reasoning. For example, students should investigate numerical and geometric patterns and express them in symbols. This is an important precursor to more formalized study of algebra in the middle grades and high school.

What does *Principles and Standards* say about the use of technology, including computers, in the mathematics classroom?
Students should have access to a full range of tools and the guidance of teachers skilled in using tools to support the learning of mathematics—these tools are a part of their world. However, "technology should not be used as a replacement for basic understanding and intuitions; rather, it can and should be used to foster those understandings and intuitions." In fact, students can learn more mathematics more deeply with the appropriate use of technology, dealing with more complex situations or more data than would be possible without technology.

What about calculators?
Principles and Standards asserts that calculators should be used appropriately, with the goal of enriching students' learning of mathematics. However, "calculators do not replace fluency with basic number combinations, conceptual understanding, or the ability to formulate and use efficient and accurate methods for computing. Rather, the calculator should support these goals by enhancing and stimulating learning."

What is the role of the teacher in grades 3–5?
Teachers make decisions every day that influence their students' opportunities to learn and the quality of that learning. Teachers need to build an environment that encourages students working together as part of a mathematics community. In such classrooms, students' ideas, conjectures, and explanations are valued and serve as a source of learning. Mistakes are seen not as dead ends but as avenues for further learning. Students come to value ideas because they are mathematically sound, enhancing their understanding through discussion of the strategies and thinking of their classmates.

Why is professional development so important?
Mathematics in grades 3–5 becomes increasingly sophisticated, while teachers are often called on to teach a variety of disciplines in addition to mathematics. Teachers need to continue to advance their own understanding of mathematics, developing a deep and flexible knowledge of the mathematics they teach, and their understanding of students' mathematical thinking.

Should schools use mathematics specialists?
This is a model that some schools have used in grades 3–5, where designated teachers assume responsibility for teaching mathematics for particular groups of students. Other schools identify mathematics teacher-leaders who organize professional development for their school. Whatever model is used, it is essential that a commitment be made to improve teachers' content knowledge.

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Higher standards for students ... higher standards for ourselves